

## A New Workerless Socially Parasitic Species of the Genus *Vollenhovia* (Hymenoptera, Formicidae) from Japan

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**Abstract** A new workerless socially parasitic species of the ant genus *Vollenhovia* is described and illustrated with a brief note on its biology.

**Key words:** Formicidae; *Vollenhovia*; workerless social parasite; new species; Japan.

Workerless socially parasitic ants have never been recorded either from Japan or among ca. 60 described species of the genus *Vollenhovia* (OGATA, 1991). Recently we found a new species of *Vollenhovia* from Gifu, Japan. This species is a social parasite on *Vollenhovia emeryi* WHEELER. After observations of several mixed colonies of the parasite-host species for several months, we concluded this species has no worker caste. In this paper, we describe the female and the male with a brief note on their biology.

### *Vollenhovia nipponica* sp. nov.

(Figs. 1 a–e; 2 a–f)

**Female.** Body length ca. 2.2 mm, head length 0.56–0.61 mm, head width including eyes 0.48–0.50, scape length 0.29–0.32 mm, alitrunk width 0.38–0.41 mm, dorsal petiole length 0.15–0.16 mm, dorsal petiole width 0.16–0.17 mm, dorsal postpetiole length 0.19–0.20 mm, dorsal postpetiole width 0.20–0.22 mm.

Head subrectangular as in Fig. 1 a, longer than wide, with feeble longitudinal rugae; frontal furrow broad from median ocellus to frontal triangle; genal margins shining, without punctures; occipital border slightly concave. Mandible subtriangular with 6 teeth. Eyes rather large, 0.15 mm in maximum diameter. Three ocelli distinct. Antennae 12-segmented; scape not reaching occipital border; the last 3 funicular segments forming distinct club. Anterior border of clypeus roundly convex.

General form of alitrunk, petiole, postpetiole and gaster as in Fig. 1 b. Alitrunk slightly convex in profile; pronotum, mesonotum and propodeum well punc-

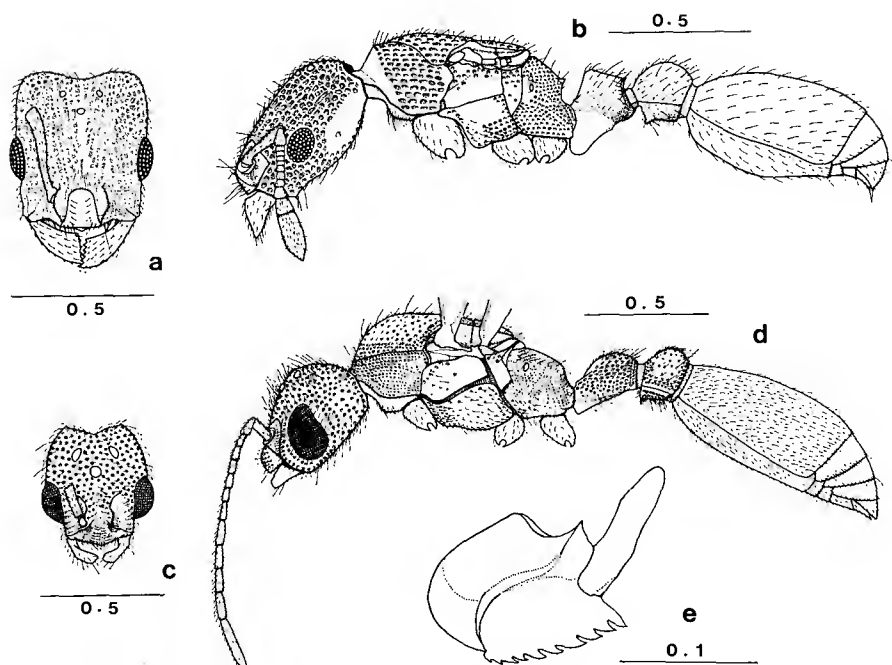


Fig. 1. *Vollenhovia nipponica* n. sp. — a, Head of female; b, profile of female; c, head of male; d, profile of male; e, right aedeagal plate of male.

tured; mesopleuron with brightly shining area lacking punctures. Petiole quadrangular in lateral view, lacking anterior peduncle; dorsal border almost straight in profile; subpetiolar process forming broad lobe as in Fig. 1 b. Postpetiole circular in dorsal view. Gaster smooth and shining.

Body color reddish brown; legs, mandibles and gaster tip slightly lighter.

*Male.* Body length ca. 2.3 mm, head length 0.46–0.50 mm, head width 0.43–0.46 mm, scape length 0.15–0.16 mm, funicular length 0.95–1.00. alitrunk width 0.43–0.50 mm, postpetiole length 0.19–0.20 mm, postpetiole width 0.20–0.22 mm.

Head as in Fig. 1 c, longer than wide, with deeply concave occipital border, with dense punctures. Mandibles small, spoon shaped, lacking teeth. Compound eyes large, the maximum diameter 0.15–0.20 mm. Three ocelli distinct. Antennae 13-segmented; scape short, not reaching the nearest ocellus; the last funicular segment longer than the previous 2 segments in length. Anterior border of clypeus convex with angulate apex.

General form of alitrunk, petiole, postpetiole and gaster as in Fig. 1 d. Subpetiolar process distinct, angular at the anterior corner (Fig. 1 d). Genitalia (aedeagal plate) as in Fig. 1 e.

Body color blackish brown; antennae, mandibles, legs and gaster tip brownish yellow.

Holotype: Female. 1. XI. 1991, Obusa, Gifu City, Gifu Pref., Japan, YAMAUCHI leg. Paratypes: 30 females, 3 males from the holotype nest; 22 females, 22 males, 16. IX. 1990, Kagamihara City, Gifu Pref., Japan, KINOMURA leg.; 10 females, 10 males, 21. III. 1991, Kaizu, Gifu Pref., Japan, YAMAUCHI leg.; 23 males, 4. IX. 1990, Obusa, Gifu City, Gifu Pref., Japan, FURUTAKI leg.

Type depository: Holotype deposited in the National Institute of Agro-Environmental Sciences (NIAES), and paratypes in NIAES and our collection.

*Remarks.* This species is easily distinguished from the host species by its reddish color and smaller body size in females, and by smaller body size, smaller funicular length/scape length ratio and distinct subpetiolar process in males (Fig. 2).

*Biology.* We found *V. nipponica* from 41 out of 72 (56.9%) colonies of *V. emeryi* collected along the Nagara and the Kiso Rivers in Gifu Pref. in 1990 and 1991. The host species inhabited decayed woods on the floor of riverside forests and their margins, forming polygynous and polydomous colonies. Almost all alate females of the host species had short aberrant wings (Fig. 2) as reported in KUBOTA (1984). In most nests collected from autumn to early spring, we found multiple reproductive females of *V. nipponica* (up to 17 individuals) in addition to many alate sexuals. However, we found no workers except for the host ones. The parasite females and males were distinctly smaller than those of the host species and as large as the host workers (Fig. 2).

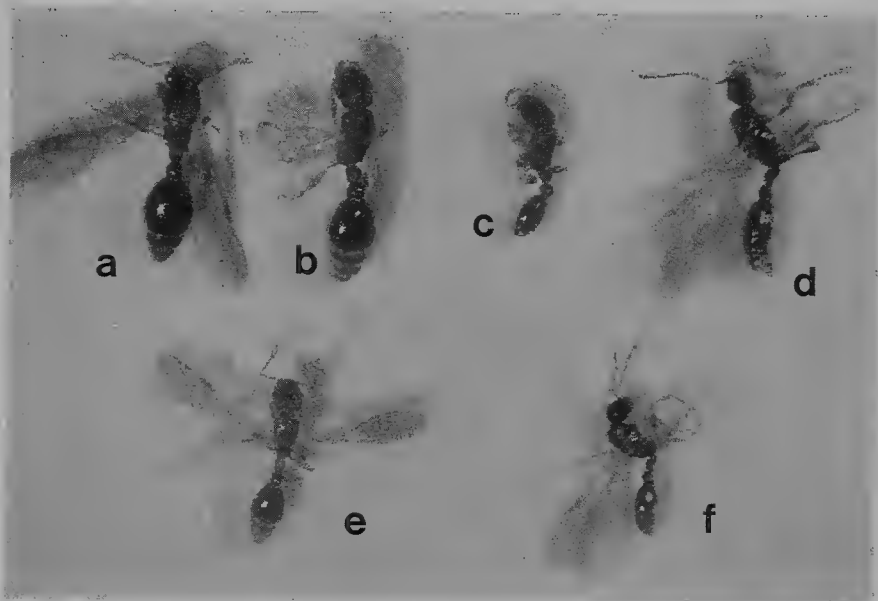


Fig. 2. *Vollenhovia nipponica* and the host species *V. emeryi*. — a, b, c, d, Normal winged female, short winged female, worker and male of *V. emeryi*, respectively; e and f, female and male of *V. nipponica*, respectively.

To determine whether this species is really workerless or not, we reared 6 parasite females together with 40 host workers for 7 months (the host workers have no ovariole). As the result, all the offsprings produced were alate (9 females and 6 males). Therefore, we concluded that this species is a workerless social parasite.

Both alate females and males of the parasite species seemed to emerge in August and September because we found several pupae in September nests. They remained in the host nest during the succeeding winter. Dissection showed that most (87.1 %,  $n=31$ ) alate females from the winter nests had an empty spermatheca while all dealated females were inseminated ( $n=40$ ). The alate sexuals did not show any mating behavior inside the artificial nest. These facts suggest that both sexuals may leave the nest in spring for nuptial flight.

Next, we made the following observation to see how new females invade host colonies: 7 females of *V. nipponica* were put at the peripheral part of the artificial nest of *V. emeryi*. Then, the workers of host species carried the parasite females into their nest in the typical adult transport posture of myrmicine ants (see HÖLDOBLER & WILSON, 1990). The females were threatened by some workers with opening mandibles inside the nest just after entrance, but the workers soon began licking the parasites and finally accepted them. The workers behaved to females that invaded by themselves in the same way as to the transported females.

Among dealated parasite females, we often observed mild aggressive behavior: When they encountered one another, they often bit the neck or petiole of another female. However, they did not show any aggressive behavior to the host workers and queens.

### References

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